

SHORTER NOTES

***Botrychium hesperium* in the Wallowa Mountains of Oregon.**—The Wallowa Mountains of northeastern Oregon boast the greatest fern diversity in the state. We reported 47 taxa in the range (Zika & Alverson, Amer. Fern J. 86: 61–64. 1996), which included 14 taxa of *Botrychium*. A number of elements from the Rocky Mountains are found in Wallowa County, to which we can now include *Botrychium hesperium* (Maxon & R. T. Clausen) W.H. Wagner & Lellinger, an addition to the Oregon flora (Wagner & Wagner, Ophioglossaceae in *Flora of North America*, Vol. 2, Oxford Univ. Press, 1993).

Botrychium hesperium is restricted in the Wallowa Mountains to a narrow elevational band in the Lostine River drainage, between 1535–1660 meters, where steep canyon walls shade the valley floor from direct sunlight early and late in the day. It is found in mesic meadows or forest edges, in full sun or partial shade, at all aspects, but only on gentle slopes or flats on the valley floor. It has yet to be located on steep slopes at higher elevations. The forests are primarily *Pinus contorta* Dougl. ex Loud., with low wet areas dominated by *Picea engelmannii* Parry ex Engelm. Associated herbs include: *Achillea millefolium* L., *Agoseris aurantiaca* (Hook.) Greene, *Antennaria rosea* Greene, *Calamagrostis rubescens* Buckl., *Carex concinnoides* Mack., *C. geyeri* Boott, *C. hoodii* Boott, *Elymus glaucus* Buckl., *Erigeron compositus* Pursh, *Festuca occidentalis* Hook., *Fragaria virginiana* Duchesne, *Gentiana amarella* L., *Hieracium albiflorum* Hook., *Linnaea borealis* L., *Sedum stenopetalum* Pursh subsp. *stenopetalum*, *Senecio pseud aureus* Rydb., and *Viola adunca* Sm. It grows with *Botrychium lanceolatum* (Gmel.) Ångstr. subsp. *lanceolatum*, *B. minganense* Victorin, *B. paradoxum* W. H. Wagner, *B. pedunculatum* W. H. Wagner, and *B. pinnatum* St. John. The sites are valley bottom Quaternary surficial deposits, locally reworked by the Lostine River or small tributaries. Adjacent slopes are sedimentary bedrock in the Triassic/Jurassic Hurwal Formation. In places the upper west wall of Lostine Canyon is granite, and the east wall is pure limestone of the Martin Bridge Formation. It is possible that all or most of the *Botrychium* populations are influenced by basic or circumneutral groundwater percolating through calcareous glacial till or moraine debris. It may be no coincidence that the richest diversity and greatest abundance of *Botrychium* species are found in the calcareous canyons of the Wallowa Mountains, rather than in the granitic or volcanic basins.

We are aware of four extant populations of *Botrychium hesperium* in the Wallowas. The Oregon range of the species is included in ca. 5.5 km of river valley. The total known number of plants at this time is less than 100, and they face threats from fire suppression, pack animal grazing, wood-cutting, and recreation-associated activities, despite the fact that most or all plants are within the Lostine River Wild and Scenic River corridor, a part of the Eagle Cap Ranger District of the Wallowa-Whitman National Forest.

Collections of *Botrychium hesperium* were first made in 1981 (W. H. Wagner 81130 MICH), with later collections in 1991 (Zika & Alverson 11295 WTU), 1992 (Zika & Alverson 11794 WTU), 1993 (Wagner et al. 93047 MICH) and 1996 (Zika & Alverson 12908 OSC). We were puzzled by these plants for many years, and thought they might represent an undescribed taxon, related to *B. hesperium*, but with slightly angular upper pinnae and shorter basal pinnae. This was a false impression, based in part on the large Wallowa plants growing in sheltered or partly shaded sites, and based on a limited sample of *B. hesperium* from Oregon and elsewhere. To get a better idea of variation in *B. hesperium*, we studied large living populations in Montana, Arizona and Colorado. Finally, as we saw more Oregon plants, we concluded they were part of the natural variation of *B. hesperium*, united by their grayish-green color, exaggerated and asymmetrical basal pinnae, broad rounded upper pinnae, and ample sporophores.

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A Binomial for the Hybrid *Polypodium* of Eastern North America.—Two species of *Polypodium* (Polypodiaceae) occur in eastern North America, the diploid *P. appalachianum* Haufler & Windham and the tetraploid *P. virginianum* L. These species hybridize, producing a sterile triploid recognized by its abortive spores and intermediate morphology. The differences between these three taxa are well described by Haufler and Wang (Amer. J. Bot. 78:624–629. 1991) and Haufler and Windham (Amer. Fern J. 81:7–23. 1991). The triploid hybrid so far has been found only on the Appalachian Plateau where *P. appalachianum* and *P. virginianum* are sympatric. The hybrid has been documented so far in Ontario, Canada and eight states: New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, and Virginia (Evans, Research Div. Monograph 2. Virginia Polytechnic Inst. and State Univ., Blacksburg, VA. pp. 117–146. 1970; Haufler & Wang, *op. cit.*; Montgomery, *Bartonia* 59:113–117. 1996). Kentucky and West Virginia can be added to this distribution, based upon specimens at OS and WVU, respectively. The hybrid likely will be documented in other states and provinces as well. Indeed, the triploid may prove rather frequent, as shown for New Jersey and Pennsylvania by the work of Montgomery cited above.